

## CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1 1. A method for statistical regression using ensembles of classification  
2 solutions comprising the steps of:  
3 running k-means clustering for k clusters on the set of values  
4  $\{y_i, i = 1 \dots n\}$ ;  
5 recording a mean value  $m_j$  of a cluster  $c_j$  for  $j = 1 \dots k$ ;  
6 transforming regression data into classification data with a class label  
7 for an i-th case being a cluster number of  $y_i$ ;  
8 applying ensemble classifier and obtain a set of rules  $R$ ; and  
9 making a prediction for new case  $u$ , using a margin of  $M$ , where  
10  $0 \leq M \leq 1$ .
  
- 1 2. The method recited in claim 1, wherein the step of making a prediction  
2 comprises the steps of:  
3 applying all the rules  $R$  on the new case  $u$ ;  
4 for each class  $i$ , counting a number of satisfied rules (votes)  $v_i$ ;  
5 classifying  $t$  has the most votes,  $v_i$ ;  
6 considering a set of classes  $P = \{p\}$  such that  $v_p \geq M \cdot v_i$ ; and  
7 generating a predicted output for case  $u$ ,  $y_u' = \frac{\sum_{j \in P} m_j v_j}{\sum_{j \in P} v_j}$ .

- 1 3. A method of pattern recognition comprising the steps of:  
2 applying clustering processes to determine a number of classes;  
3 applying ensemble learning classification processes to predict most  
4 likely classes for a new example; and  
5 then averaging regression values of most likely classes to predict a  
6 value of a new example.
- 1 4. A method of pattern recognition for a set of values, said method comprising  
2 the steps of:  
3 determining a number of classes to be generated based on a trend of  
4 error of a class mean/median for the set of values;  
5 classifying the values using ensemble learning classification and the  
6 determined number of classes;  
7 generating a set of classification rules; and  
8 averaging regression values of most likely classes to predict a value of  
9 a new example based on the set of rules.
- 1 5. A method of pattern recognition according to claim 4, wherein said step of  
2 determining a number of classes comprises the steps of:  
3 determining the class mean/median for a variable number of classes;  
4 determining a mean absolute deviation (MAD) based on the class  
5 means/medians; and  
6 comparing the MAD to a predetermined percentage of MAD.
- 1 6. A method of pattern recognition according to claim 4, wherein the step of  
2 averaging regression values includes using margins for predicting the value of  
3 the new example.

- 1 7. A method of pattern recognition according to claim 4, wherein the step of
- 2 averaging regression values comprises the steps of:
- 3       applying the set of classification rules to the new example;
- 4       for each class  $i$ , counting a number of satisfied rules (votes)  $v_i$ ;
- 5       classifying  $t$  has the most votes,  $v_i$ ;
- 6       considering a set of classes  $P = \{p\}$  such that  $v_p \geq M \cdot v_i$ ; and
- 7       generating a predicted output for case  $u$ ,  $Y_u' = \frac{\sum_{j \in P} m_j v_j}{\sum_{j \in P} v_j}$ .

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